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ABSTRACT

A computerized system on faculty research interests and activities, which was developed by an academic health sciences center, is described. The objective of the information system is to better match faculty capabilities with potential funding opportunities. The case study is designed to assist other institutions by outlining the characteristics of the system and the procedures to be undertaken for developing databases in this area. Consideration of these characteristics and strategies should help ensure that the resulting information systems are easily and quickly implemented, require minimal financial resources, are readily accessible by all approved users, and can respond to different types of requests from both faculty and campus administration. The following strategies for the successful development and implementation of a system include: consensus on the current and anticipated needs for the data; identification of the specific data items required to meet these needs; prior planning with all parties involved in designing, implementing, and ultimately using the information system; identification of variables for which data already exist and that require only updating of information; and identifying variables for which no information exists. (Author/SW)

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Characteristics of and Strategies for Information Systems on Faculty Resources: A Case Study

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Jean Roge and Georgine Pion

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D. R. Coleman, Chairman
Forum Publication
Advisory Committee

Abstract

This paper describes a computerized system on faculty research interests and activities developed by an academic health sciences center. Its primary purpose is to assist other institutions by outlining the characteristics of the system and the procedures to be undertaken for developing data bases in this area. Consideration of these characteristics and strategies should help ensure that the resulting information systems are easily and quickly implemented, require minimal financial resources, are readily accessible by all approved users, and can respond to different types of requests from both faculty and campus administration.

Characteristics of and Strategies for Information Systems on Faculty Resources: A Case Study

College and university administrators have long been interested in developing strategies which will assist faculty in securing external sponsorship for research, training, and public service activities. One direct outgrowth of this interest has been the development of information systems for better matching faculty capabilities with potential funding opportunities. As the research enterprise has grown in complexity and sophistication, these information systems have matured from simple hand-written index card files to highly refined computerized data storage and retrieval systems. Moreover, such systems have been shown to be highly successful. For example, it was reported that in 1974 the automated faculty information system developed by Stanford University accounted for over $1 million of additional external support to the institution (Rodman, 1977).

Recent changes in the research enterprise have reaffirmed the need for such systems and their continual refinement. The decline in federal research funding and the subsequent increase in the already fierce competition over resources have made it essential that any loss of funding opportunities stemming from lack of communication to faculty be avoided. Thus, improper targeting and snail-like dissemination of information regarding grant programs, contract solicitations and student fellowships are unacceptable practices. The entry of such new research sponsors as industry and venture capital companies also has indicated the need for rapid dissemination of information and suggested that previous classifications of research areas, developed from experience with federal funding priorities, may be inadequate for describing commercial interests. Further, the complex problems currently included in sponsors' research and training agendas increasingly mandate interdisciplinary and team-oriented approaches. For example, a successful response to opportunities for R & D in clinical diagnostic instrumentation now requires the collaborative efforts of a physicist,

computer scientist, biochemist, engineer, radiologist, and physiologist, all of whom may have never previously interacted at the university.

As one way of dealing with this new situation, colleges and universities are now either initiating or improving their information systems on faculty research interests and activities. Typically, Offices of Sponsored Research have shouldered the major responsibility for the design, implementation, maintenance, and updating of these systems. However, institutional resarchers can and should be key participants in this process. Given their skills in survey methodology, analytic strategies, and data management techniques, their knowledge of institutional goals and concerns, and their involvement in other on-going data-collection efforts, institutional researchers can contribute significantly to developing state-of-the-art techniques in the area. In fact, institutional research has a stake in facilitating the implementation of these information management systems if, as Dressel (1972) has claimed, the success of institutional research depends increasingly upon furthering action to lessen any "functional weakness" and to improve the effectiveness of our institutions. The end result will be that institutional researchers will be facilitators of changes in administrative practices governing university research activity (Terras and Pomrenke, 1981).

The Current Status of Faculty Information Systems

Two basic strategies have been used by institutions in developing faculty research information systems: (1) a completely new system is designed by the institution itself; or (2) data-collection instruments and computer programs previously developed by other institutions (e.g., the SCRIPT system of Stanford University, the FRII system developed by New York University, and SUNY'S RQIP system) have been utilized. The decision as to which strategy an institution will adopt depends on many factors but primarily centers around time and cost constraints. For smaller research institutions, such cost considerations often preclude the use of currently marketed systems, particularly if there is the perception that sufficient expertise is available on site for development and design.

In general, most faculty information systems are kept very simple in order to hold down the expenses of their operation. They use existing inquiry language, software and

equipment and "bare-bones" surveys to gather the necessary information on faculty demographics, current research activities and publications (Rodman, 1977). Frequently, word processing equipment is used to fulfill the function of a larger computer (Duncan & Wright, 1981), although some systems use existing software and CRTs connected to mainframe computers for storage and retrieval of information (Bearse and Maxwell, 1978). Some systems are oriented towards enabling searches performed by faculty members themselves for appropriate funding opportunities, usually through a system of computer-coded keywords and phrases of grants announcements and contract RFPs (Lowery, Bradshaw, & Sansone, 1979). Other systems use existing numeric codes such as those developed by HEGIS to identify broader research interests (Napier, Morse, Goldknopf, and Gumnick, 1978). In fact, one major characteristic of these systems is their diversity.

This paper describes the experiences of a health sciences center in developing and implementing within 3 months and at a cost of approximately $7,000 a computerized faculty research information system. Its purpose is not to advocate the wholesale adoption of the data-collection instruments and computer system we used but rather to assist other institutions now giving thought to implementing thier own systems. As such, issues relevant to the development of a faculty information system and strategies for its successful implementation will be described. Finally, the implications of such information systems for institutional research and higher education in general will be discussed.

Necessary Characteristics

There are several issues involved in the design and implementation of any new computerized information base. These issues center around the type of data which should be collected, the identification of individuals on whom information should be obtained, the identification of the individuals who will be responsible for the various components of the system and the nature and level of their involvement, the source of funds for related costs of data collection, implementation, and operation, and the anticipated benefits of such a system. All of these issues are familiar to institutional researchers. Consideration of these issues define the characteristics necessary for a useful faculty research information system. These characteristics include: (1) the inclusion of all information on all

individuals judged necessary for meeting the objectives identified by initial planning; (2) the ease and speed with which the system can be implemented; (3) adequate access for all parties involved; (4) easy updating of the information; (5) versatility and utility of the system in responding to standard and novel requests for information; and (6) the cost-effectiveness of the system.

Inclusion of the necessary information. The types of data which should be incorporated into faculty research information systems depend partly upon the intended uses of the system. Given that the underlying thrust concerns facilitating faculty research and scholarship, the primary goal of these systems is the improved matching of funding opportunities with the faculty most likely to benefit significantly from such opportunities. Consequently, variables which best describe faculty capabilities must be identified.

Typically, one or more of the following variables are included for describing faculty research capabilities: professional identification (e.g., economist or immunologist); specialty areas (e.g., nursing research or developmental psychology); titles of current publications and/or presented papers; awards and honors received; certification and licensing (e.g., Board certification in radiology or state licensure to practice medicine); titles of currently-held grants and contracts; descriptors of current research and/or scholarly activites; and descriptors of current research interests. As can be seen, these characteristics focus on an individual's past achievements, current activities, and/or projected efforts (given their current interests).

The adequacy of each variable depends on how one defines the benefits associated with responding to research opportunities. For example, it is well-known that strong track records in securing external research support constitute a distinct advantage in obtaining future support. As such, previous and current research activities, funding support, and publications are useful in identifying individuals who can benefit from grant and contract solicitations, particularly when the lead time for responding is short. However, benefits should not be equated only with the procurement of outside funding. The benefits of submitting a proposal which undergoes critical and constructive review by

one's peers are invaluable, particularly for new faculty or those wishing to begin work in an area different from their past efforts. In addition, for such opportunities as faculty development (e.g., announcements of international workshops or courses in new research techniques), descriptors of research interests, regardless of previous work in the area, are appropriate.

Of course, disseminating information of research opportunities and the generation of mailing lists necessitate the inclusion of such variables as name of faculty and campus address. Other academic history variables (e.g., highest degree, academic rank, and year hired at the institution) are useful, given that certain research/scholarly opportunities are limited to individuals with certain training and experience (e.g., M.D.s, J.D.,s or instructors and assistant professors). The variables included in our information system are listed in Figure 1.

In describing research interests and activities, selection of an appropriate classification scheme is crucial. Several taxonomies have been developed explicitly for this purpose (e.g., Rodman, 1982). Classification schemes designed for related efforts, e.g., the codes designed for the Higher Education General Information Survey (HESIS) or the Illinois Research Information System (IRIS), have also been used. The major consideration is the extent to which the anticipated uses of the system require very broad categories, very specific categories, or both types for the searching process.

The use of broad classification schemes has both advantages and disadvantages. The primary advantage to these global taxonomies is that formal grants announcements frequently identify only broad areas of interest (e.g., research in pharmacology or programs in career education). At the same time, this sweeping breadth may result in notices of research opportunities being sent inappropriately to a large number of people. Since the receipt of three or more irrelevant mailings may cause faculty to view the system as less than useful, this defeats one of the primary purposes the system was intended to fulfill.

The sole reliance on highly detailed classification schemes suffers from related problems. Searches using codes for narrow and very specific areas may result in the

unwarranted exclusion of appropriate individuals. Users of the system may also experience difficulty in translating very broad categories identified in a funding announcement into specific descriptors for searches. As such, the best approach is to have both types of information. The information system then has the capability of allowing both types of searches -- i.e., broad and/or very specific -- to be conducted.

For most institutions, existing taxonomies, with or without modifications, will be adequate for use in faculty information sytems. A major factor involved in the choice of a final taxonomy is the type of research expertise at the institution. For example, a health sciences center has a relatively well-circumscribed research emphasis -- research on human health and illness. As such, several existing schemes (e.g., those developed by HEGIS) may include a large number of irrelevant categories (e.g., civil engineering and forestry) and an insufficient number of categories which can successfully distinguish faculty in other than extremely broad ways (e.g., a biochemist vs. a physiologist). In these situations, modification of existing taxonomies is clearly warranted.

Some information systems impose no classification scheme upon respondents. Rather than marking which descriptors best identify their interests or activities, faculty are asked to supply paragraphs or keywords. There are both strengths and weaknesses to this approach. For example, Bearse and Maxell (1978) reported a difference based on response format in the number of faculty identifying research interests in "Alcohol." Whereas 38 persons checked this category when listed on a questionnaire, only 11 identified it when asked to supply keywords on their own. Although the reasons for this difference are unclear, it does suggest that the practice of requesting respondents to provide only keywords so as to avoid lengthy questionnaire lists of categories should be carefully considered.

Problems with inaccurate marking of categories made by respondents also can be avoided by using this keyword strategy, along with issues associated with forcing individuals to "fit" themselves into some prespecified categories. However, a keyword classification will have to be developed ad hoc so as to enable subsequent computer searching strategies. This is a tedious process which requires some knowledge in the

research areas surveyed so that technical terminology is used correctly and similiar but differently stated interests (e.g., Alcohol Abuse vs. Ethanol Abuse) are handled appropriately.

In our case, both types of response formats were used -- faculty "checked off" up to 10 broad interests and provided paragraphs and/or keywords for detailed descriptors. In this way, the largest number of individuals could be first identified in any search and then, if necessary, carefully screened through the use of highly specific keywords.

The optimal strategy is to "pilot test" taxonomies under consideration. Samples of faculty from various areas/units, selected for their diversity, can be queried regarding the appropriateness of the descriptive categories. The only drawback to this is that additional time is needed before data collection can be initiated -- a luxury which frequently cannot be afforded. However, even a small sample (i.e., 25-30 individuals) will be sufficiently useful to identify any gaps in the research descriptors.

It is also necessary to identify the population of interest. Questions center around whether non-salaried faculty should be included, whether postdoctoral fellows, visiting professors, and similar categories of academic staff should be surveyed, and whether administrative and clinical staff (e.g., physicians) should be included, to name a few. Primary issues here concern which individuals are most likely to benefit from inclusion in the information system, given its projected uses, and the "temporary" nature of an individual's relationship to the institution.

Ease and speed of implementation. Data collection, input, storage, and retrieval are all integral parts of implementation. No information system will be valuable if data are obtained for only a minority of the population of interest. Utility will also be eroded if data entry and development of procedures for accessing the data consume several months. As such, issues related to ease and speed of implementation are important in deciding whether or not a new system will be designed or one currently being marketed will be adopted. These issues include the development of a new survey instrument or use of an existing one, data collection, coding and data entry and the interface of inquiry language and data base.

Capacity for rapid and easy access. Without reasonable access to an information system, even the best designed system will remain underutilized or, at worst, not used at all. Since the primary focus of a faculty research information system is the quick and accurate targeting of information to faculty and administrators, all aspects of the system must allow swift and uncomplicated use. If several faculty and administrators will be using the system, location of the computer terminal must be in a central and logical place. If there is a Research Office in the institution, this would be an ideal place to locate the operation of the information system. Faculty and administrators accustomed to one location for research information will not require "re-education" as to the locus of information.

Additionally, the system should include a simple on-line inquiry language for speedy and simple data retrieval as well as a relational type of file structure so that data can be retrieved on any basis desired by the user. This approach allows direct access to information in the data base without intermediate search steps and is, therefore, easier to learn. Policy decisions relating to who is given access should be made by the individuals responsible for research administration.

Ease of information update and modification. Any system requiring complicated and time-consuming maintenance quickly falls into disuse. By building the faculty resource system onto the back of a regularly maintained data base, such as one in the institutional research office on faculty demographics, users will be assured usable and up-to-date information. Ideally, the computer file can be maintained through both on-line and batch modes. When this process is also a regularly occurring part of the institutional research office operation, then there is no additional cost for the faculty information system. An on-line inquiry language using simple statements and not requiring extensive training will further assure that the information in the system is timely and that the system itself remains responsive to user needs.

Versatility and utility of the system. The type of data typically collected in faculty research data bases has primarily been used to match faculty research activities with potential sponsors. However, these same data are applicable for other uses, often with

only a minor augmentation of the original information. For example, in our situation, several other uses have developed for the data beyond what was originally intended:

- The identification of members for university committees regarding research-related matters (e.g., developing guidelines for faculty conduct in university-industry research arrangements).
- The selection of peer reviewers for faculty research proposals requesting funding from the university;
- Quick responses to information requests from campus administration (e.g., a request for the number of faculty who are interested in international training and research and who should be included in a future survey); and
- The identification of faculty for nominations for national prizes and awards (e.g., the Texas Instrument Award).

Cost effectiveness. Obviously, the benefits associated with such information systems must be equal to the time, effort and funds required for development, implementation, and maintenance. While it is difficult to quantify benefits precisely, it is necessary to keep in mind that the cost-effectivenss of the system hinges on the types and frequency of usage for the system. In this light, the benefits of updated information bases and a new information system available for institutional research help mitigate the cost for personnel and services.

Strategies for Successful Development and Implementation.

In order to ensure that these characteristics are found in a system for faculty research information, certain strategies are recommended. With regard to the development of an information system, these expedients include: (1) consensus on the current and anticipated needs for the data; (2) identification of the specific data items required to meet these needs; (3) prior planning with all parties involved in designing, implementing, and using the information system which will finally emerge; (4) identification of variables on this list for which data already exist and which require only an updating of information; and (5) identification of those variables for which no information exists and which consequently must be incorporated into any new data collection efforts. Strategies for successful implementation are: (6) the "piggybacking" of new data collection efforts onto already planned data collection activities; (7) the securing of higher administration's commitment to the project, particularly in terms of its

implementation; (8) the minimization of response burden for faculty; and (9) the interfacing or "tieing in" of the data retrieval system with already existing information systems on campus.

Consensus of current and anticipated needs for the data. In developing an information system, it is imperative that the needs for the data and the corresponding uses be clearly identified and agreed upon. Since these types of information systems are primarily used by Offices of Sponsored Research, the needs are typically defined by these individuals. However, in enumerating these goals and objectives, it is important to be less parochial and speculate on the possible uses of the system by other units in the institution. In this area, institutional researchers often have a good "feel" for who would use or need such information. Given that such systems are now being designed for access by outside organizations (e.g., a high-technology firm might want to quickly identify nearby university faculty engaged in genetic engineering research), it may be wise to consider the needs of these external requestors, although they should not conflict with university goals and practices.

In our situation, the impetus for the project came from the Research Administration Office. The primary objectives were to develop a system which could: (1) more accurately and efficiently target information on external funding opportunities for faculty research and student training; (2) identify groups of faculty with similar interests who may be unaware of nearby colleagues and who may benefit from interdisciplinary research opportunities; (3) locate appropriate faculty to serve on committees dealing with university research policy administration and facilites; and (4) obtain a general sense of faculty usage of major scientific research instrumentation so as to begin a process of long-term planning for equipment acquistion and upgrading. These goals were agreed to by both the Chief Executive Officer of the campus, the Chief Administrator for Research, the Director of a centralized research facility for research equipment, the Associate Vice Chancellor for Resource Planning and Allocation, and their corresponding staff. The role of consultants on information management systems was filled by the institutional research office, acting as "information broker."

Identification of the necessary data items. The delineation of and concensus on the needs and uses for the data dictate the type of information to be collected. It is important to obtain the appropriate mixture of parsimony and imagination in constructing these objectives and identifying the actual data elements required so as to ensure that all requisite data will be collected without extraneous information being requested of respondents. If the list becomes too cumbersome, it may be useful to first prioritize the objectives.

Given our objectives for the project, certain classes of data became mandatory. Obviously, faculty identification and campus location were important. Academic history was also important so as to better target the dissemination of funding prospects limited to certain subgroups (e.g., recent Ph.D.s., registered nurses, etc.). Both broad and detailed information on research interests was imperative so as to enable both types of searches. Finally, data on types of major scientific equipment used in research (e.g., electron microscopes and computers) and interests in international and industrial types of activities was also seen as important, given current funding opportunities in these areas.

Prior Planning. The development of any information system requires some planning. One successful strategy which we discovered was the inclusion in the planning process of all individuals with vested interests in the data base - - from Vice Chancellor to computer programmers. All appropriate staff from the Research Administration Office and the Institutional Research Office met to discuss the best way to develop such an information base. It was found, on the basis of these discussions, that the Institutional Research Office already had an information system containing most of the data required for faculty history and demographics. As such, only information regarding equipment usage and research interests and activities needed to be gathered.

Piggybacking. One practice enabling the preceding strategy is to piggyback data gathering of any additional information onto that of an existing collection effort. Data collection performed on a regular basis represents a promising method for obtaining the data. By consolidating these efforts, one information-gathering packet can be distributed which will not tend to be overwhelming to the faculty who must respond.

In addition, this practice uses existing patterns of distribution and collection which tend to be more stable and reliable.

In our situation, the process of collecting data for federally mandated faculty time and effort reports (OMB Circular A-21) provided the ideal vehicle for data collection. The population required to provide information for this reporting matched almost exactly the population of respondents for faculty research data. Moreover, one information-gathering packet could be devised and existing patterns of questionnaire distribution and collection utilized. An intensive follow-up strategy was already in place for this faculty effort reporting which could be used to insure responses to the faculty interest survey.

Commitment. Crucial to the success of the faculty research information system is a consensus from high level administration on down that the need for such a system is a high priority. If high level administrators are persuaded that a need exists for faculty to be apprised of and seize opportunities for research funding, they will provide the support to investigate, develop and, most importantly, implement the system. The commitment to support will be essential in gaining faculty cooperation in any data gathering action as well as in assuring a top priority status of the project. Without this support, the implementation of the faculty resource system will not flourish. As previously mentioned, we obtained strong support from the Health Sciences Center administration for this activity.

Maximum faculty response strategy. The cooperation of higher administration is also useful in ensuring high response rates in surveying faculty. The administration identified the collection instrument as the registration vehicle for graduate faculty membership -- all faculty who did not respond were to be dropped from membership. In addition, by including instruments for both faculty effort and research interest reporting in one packet, it was perceived that responding was required. In those cases where individuals did not have research interests or did not wish inclusion in the information system, they indicated this on the questionnaire. This resulted in 1149responses from a population of 1588 (72.3%).

Interface with existing data bases. Of significance in the overall strategy for the

faculty research information system was the interface with existing data bases. The structure of the data base as well as the information already contained within the file enabled the project to have a headstart in terms of both time and expense. Since the existing file contained demographic, degree and appointment information identified as necessary for the faculty research file, no new instrument for collecting these data was needed. By sending a printout of existing information on these variables along with questionnaire on research interests and activities, the survey, the Institutional Research Office was assured of timely, updated information for their own files as well as a high response rate from faculty.

This information system was also designed for linkage with other information systems in use by the Research Office. Although these systems employed a mini-computer rather than a main-frame and employed different programming languages, social security number was a key identifier in all systems, including the faculty information system. As a result, research administrative staff can sit at one terminal and obtain information on: (1) an individual's research interests and activities, using the faculty information system; (2) data on proposals submitted to and awards received from outside agencies, using a research proposal/award managment system; (3) data on research funds awarded by the university, using another system designed for this purpose; and (4) information on the condition of major research instrumentation located in the faculty's laboratory, based on a computerized equipment inventory. These types of linkages allow a fairly extensive profile of research activity. They also allow cross-checking of information derived from various sources (e.g., when a faculty member reports no research activity on one questionnaire but serves as Principal Investigator on 2 active research grants). Moreover, the use of the IRIS codes with supplementary categories allows a faculty member to have his/her research interests used in obtaining information on funding sources by means of the IRIS computerized system.

Implications

The development of such systems repesent a major advance in facilitating and administering university based research. We foresee several implications as the number

of these and other such systems steadily increases, some of which can be immediately identified as beneficial and others which may be cause for concern.

Improved targeting and outreach of information. It is obvious that information on outside funding opportunities can be more efficiently and effectively targeted with a computerized system, especially one linked with institutional research data bases. Moreover, such a system can be beneficial in reaching somewhat isolated faculty. In our instance, the College of Medicine is comprised of four geographically distant sites. By soliciting faculty information on research interests, we are extending the "old-boy" network strategy to all appropriate faculty regarding potential opportunities in their areas of interest.

Enhancement of faculty resources. Related to this is the resulting ability of higher eduation to capitalize on faculty expertise. For example, a committee was created to develop a long-range plan for upgrading scientific equipment on campus. The responses made to equipment usage items on the survey allowed us to select the most appropriate and well-versed faculty to serve on this committee. In addition, the ability to obtain thoughtful and well-informed peer reviews for proposals has been enhanced due to the identification of recently hired faculty and postdoctoral fellows.

Privacy concerns. One issue which emerges in the evolution of such systems is the level of accessibility of the data. A balance must be struck between allowing faculty to make use of the system and guarding their right not to be harassed by several requestors. This becomes an extremely important consideration if, in fact, access by outside organizations is permitted.

In our case, it was decided that all requests for information would be handled through the Research Office. Part of the reason for this decision concerns the perception that faculty privacy had to be maintained. Perhaps the most striking example of possible hazards associated with wide access is the recent controversy over the use of animal research. Any access to information regarding research activities which use animals might have serious and undeserved repercussions for a faculty member or the university, if placed in the hands of certain groups (e.g., anti-vivisectionists).

Communication among individual systems. In principle, it would be highly desirable to establish interactive networks among the individual faculty research information systems operating on different campuses. This would allow, for example, faculty to identify potential colleagues or expertise in other institutions. While this is currently possible through a formal request from one institution for a specific computer "search", in all likelihood the frequency of such requests is low. What would be ideal is to allow some type of limited access or "on-line" searching of data records maintained by other institutions; however, the diversity of existing systems at present mitigates against this. More information on the actual effectiveness of such systems for stimulating faculty collaboration will have to be obtained before widespread development of "on-line" interinstitutional linkages is recommended.

Facilitator role of institutional research. As consultants to administrative and academic units, institutional researchers have a significant role in the changes occuring in higher education. When institutional researchers can use their experience and knowledge to facilitate the use of new technologies or new uses for existing data systems, such as the system described here, they work positively to improve institutional practices and expand the options available for responding to the current transitions in higher education.

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Figure 1

Variables Included in the University of Illinois at Chicago's
Faculty Research Information System

Existing Data

Birthyear
Board certifications - coded
College - (school and department)
D.E.A. License
Degrees - year and institution
Effective and termination dates (each appointment)
Function, staff - coded
Graduate faculty membership - coded
Hire, date of
Hospital house staff membership
Ledger, - coded
License; status at date of hire
Location, geographic - coded
Name, last and first
Post doctoral information - (type and location)
Race/ethnic - coded
Rank (each appointment) - coded
Sex/marital - coded
Specialties and sub-specialties - coded
Social security number
Service required (each appointment) - coded
Tenure status (each appointment) - coded
Tenure, year of

New Data

Broad descriptors of current research interests - coded

Detailed profile of current research interests and objectives (statements from which keywords were derived)

Types of major equipment used in current research endeavors

Interest in international and industrially sponsored activities